

# ArcGIS Components

## In this Chapter you will learn

- The different components of ArcGIS: ArcMap, ArcCatalog and ArcToolbox
- About the differences between ArcView, ArcEditor and ArcInfo

ISTC Topic:

1.2

## 1. Different components of ArcGIS desktop

There are three main components that together make up the ArcGIS Desktop software. All three components are shown in figure 1.1.

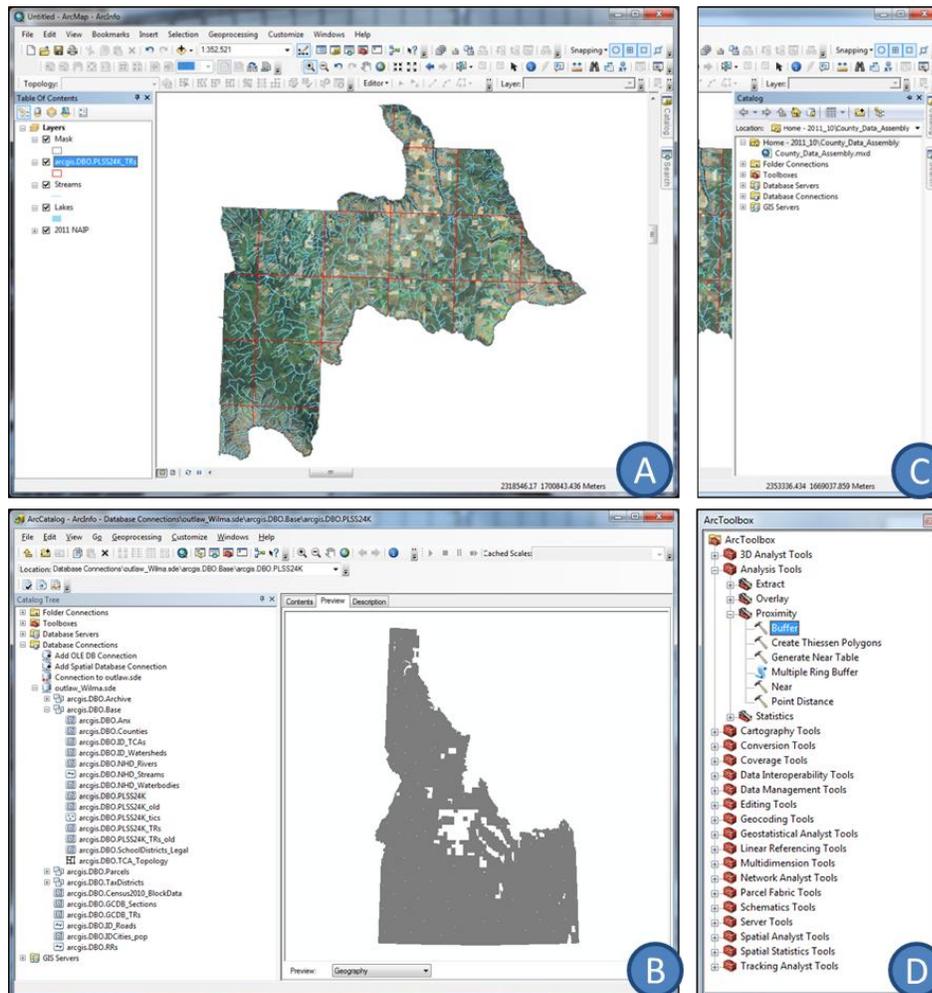


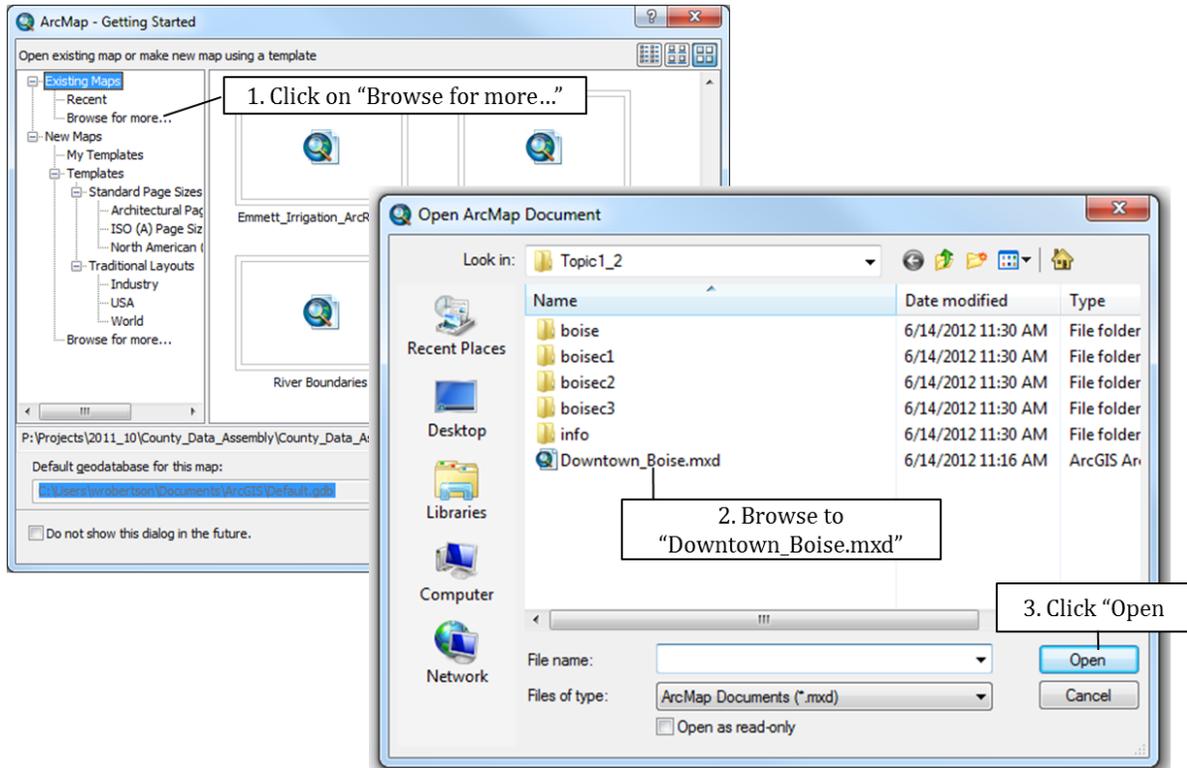
Figure 1.1. (A) ArcMap is used to display geographic data, do analyses and make maps. (B) Data is organized, copied and pasted using ArcCatalog. ArcCatalog can be accessed by itself, or as part of the ArcMap interface (C). Many of the geospatial analyses and geoprocessing capabilities are accessed through ArcToolbox (D).



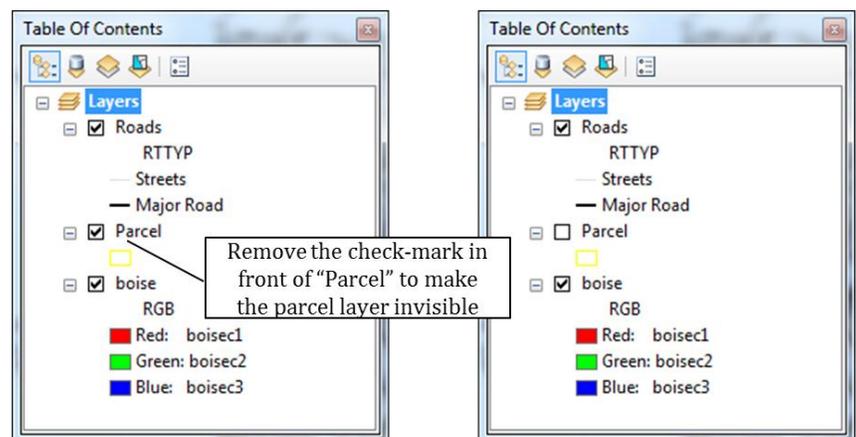
1.2: Opening a Map Document

## Exercise 1: Starting ArcMap and exploring a map document

1. Go to Start > All Programs > ArcGIS > ArcMap 10 to start the GIS program
2. Open the Downtown\_Boise.mxd inside the Topic1\_2 folder as shown below



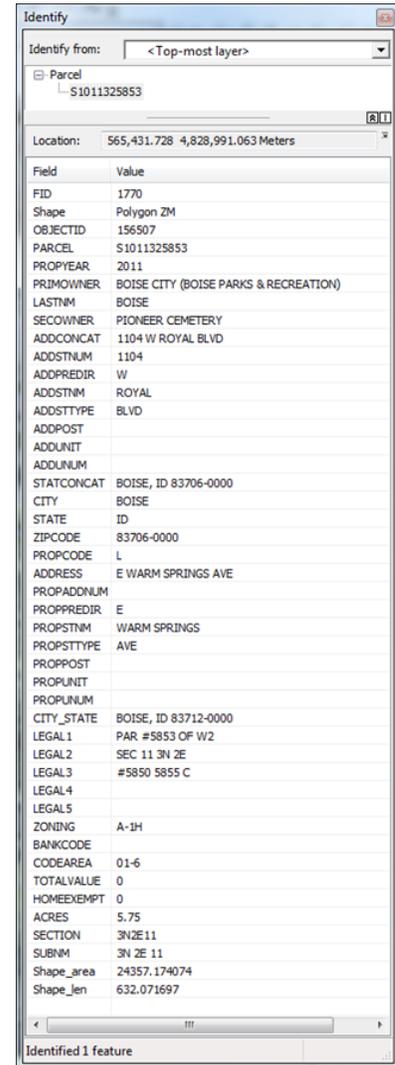
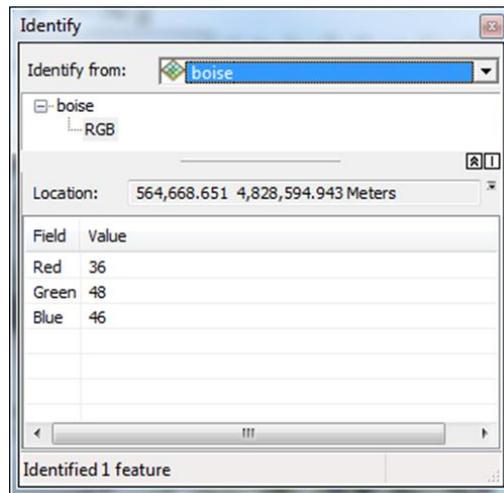
3. The map you see has three different **layers**: roads, parcel and an aerial photo of a small area in Boise. You can turn layers on and off by checking, and unchecking the boxes in front of the layer name. Remove the check mark in front of the Parcel layer and you will no longer see the parcels.



4. The Roads layer contains **line features** and the Parcel layer contains **polygon features**. One feature would be one line segment, or one road. An important strength of a GIS system is that features are associated with **attributes**, or pieces of information about each and every feature.
5. Click on the Identify Tool as shown below and then click on any parcel on your map.



- As shown on the right, you will see a long list of **attributes** associated with the parcel you clicked on. Use the identify tool and click on a road to see what attributes are associated with this layer.
- Rasters only have a limited number of attributes – typically only one. For example a raster showing the elevation will *only* have one attribute, which – no surprise – is elevation. The aerial photograph on your map has three attributes, as shown below: Red, Green and Blue that together produce the color image.



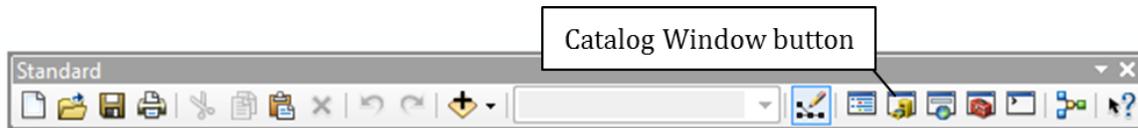
- A **map document**, which can be identified by its .mxd extension, contains information about (1) which GIS data you want to display; (2) where this GIS data is located and (3) how you wish to symbolize this data. Note that the map document does not store actual spatial data, just a path to where this data resides.
- ArcMap is often used for composing and printing maps. Click File > Page and Print Setup in the top-left corner of your screen. This is where you can set your printer and page size. If you were to print a map (which you are not at this time) you would click on File > Print. Leave the Downtown\_Boise.mxd open if you are planning to move on to exercise 2.

## Exercise 2: Exploring ArcCatalog

- Make sure you are in ArcMap and viewing the Downtown\_Boise.mxd map document you opened in exercise 1. If not, use the instructions in step 2 of the previous exercise (Exercise 1) to open the Downtown\_Boise.mxd right now.
- ArcGIS software has two versions of ArcCatalog. The “full version” needs to be accessed from your Start > Programs > ArcGIS > ArcCatalog menu and the “limited version” is conveniently

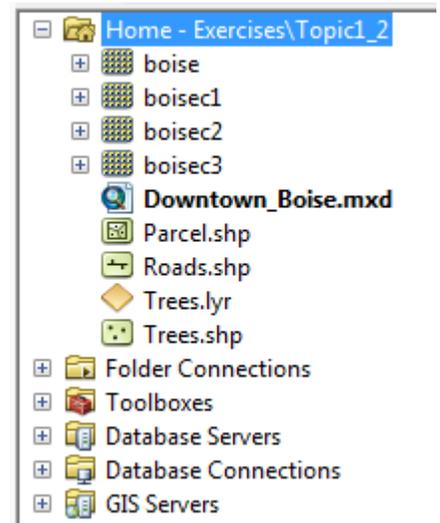
included as a window inside ArcMap. In this exercise we will first explore the “limited version” inside ArcMap. There are two ways to open the ArcCatalog in ArcMap:

- a. Click on the ArcCatalog button as shown below.

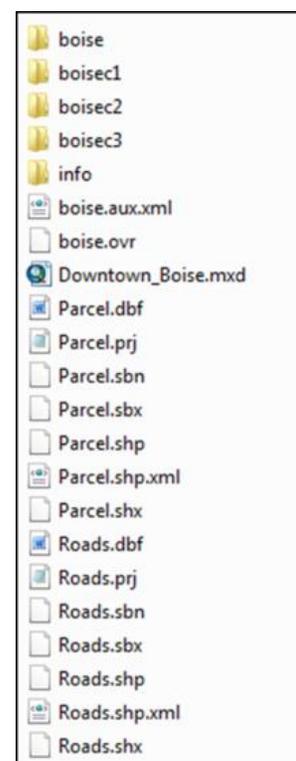


- b. Or click on “Windows” in the main menu along the top of your screen and click “Catalog”. Use one of those two ways to open the ArcCatalog window now.

3. Near the top of the ArcCatalog window you will see the Home folder which is highlighted in blue in the figure on the right. Inside this folder you will see the GIS layers contained in the Boise\_Downtown.mxd map document.
4. ArcCatalog conveniently places icons in front of each GIS layer that indicates the type of layer:  indicates a raster.  is a polygon layer,  a layer with line features and the  icon is a map document.



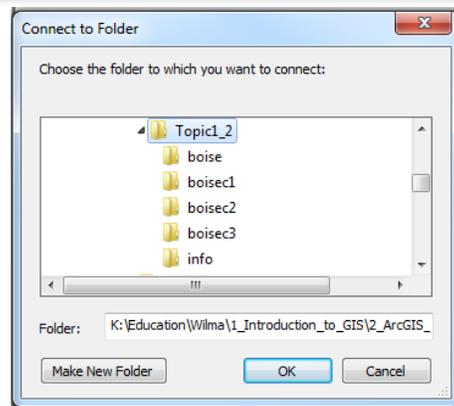
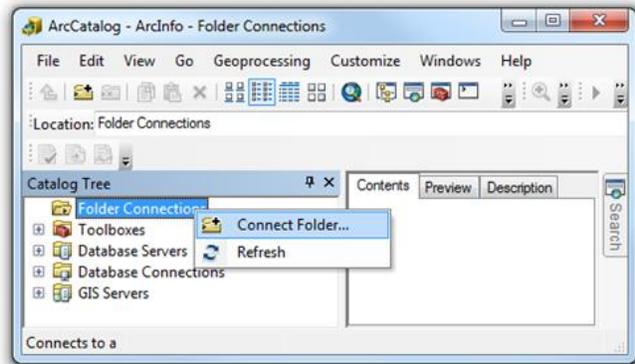
5. A **shapefile** is a common GIS data type and it is good to understand how ArcCatalog displays a shapefile, compared to what this shapefile looks like when viewed in Windows Explorer.
6. Go to Start > Computer and browse to Topic1\_2 folder you downloaded. Notice that the Roads and Parcels layers each have many files associated with it. For example, the parcels shapefile consists of 7 different files, each with a different extension. It is a good idea to always use ArcCatalog to copy and move GIS data so that you are always sure that you are copying or moving *all* the files that make up one layer.
7. Close ArcMap by clicking File > Exit in the top-left corner of your screen. When prompted save your changes.



8. To open the “full version” of ArcCatalog click on the Start button in the bottom left corner of your screen and then choose All Programs > ArcGIS > ArcCatalog. This “full version” looks very similar to the “limited version” of ArcCatalog, but has a couple of added features such as a contents, preview and description tab.

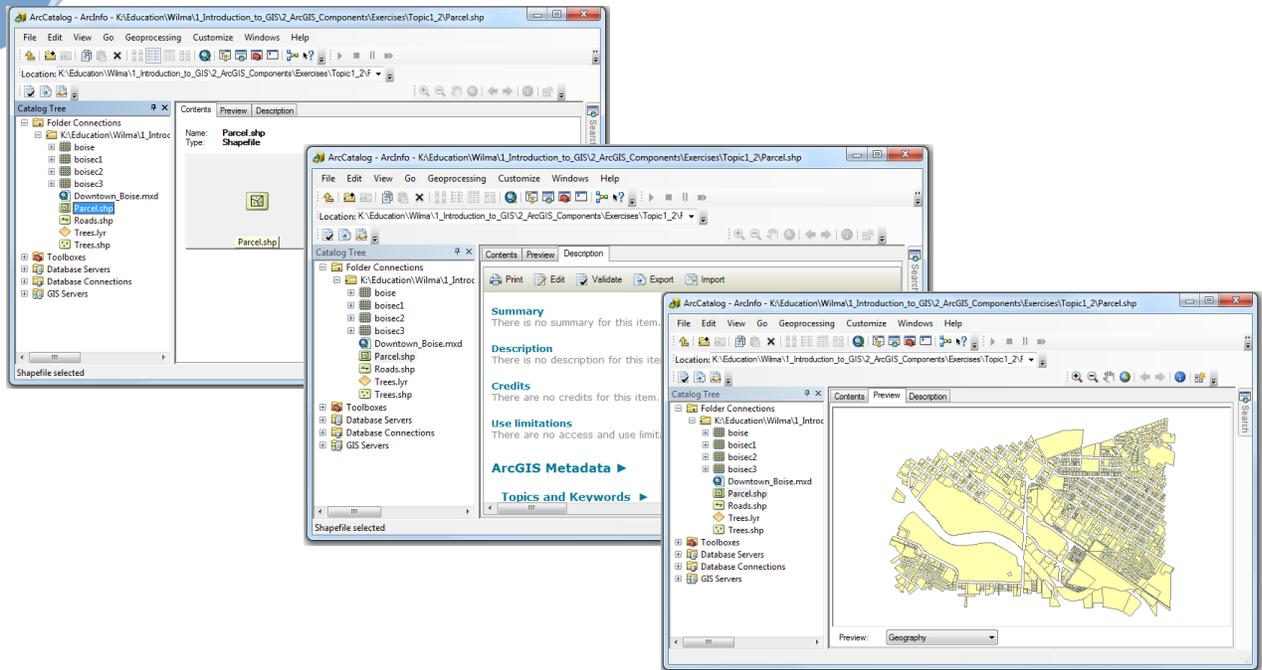
## Connecting to a Folder

- a. Right-click on “Folder Connections” and choose Connect Folder as shown on the right.
- b. Browse to the Topic1\_2 folder and click on it once to highlight it. Then click OK to finish the connection as shown on the right.
- c. Once a connection to a folder has been set up you should see it in all future sessions of ArcCatalog.



1.2: Making a Folder Connection

9. In the table of contents inside ArcCatalog click on the + in front of Folder Connections to expose its contents. Open the Topic1\_2 folder and click on the Parcel layer. If you do not see a folder that contains the data you are looking for use the directions in the blue box below to make a connection to a folder so that it will appear in the table of contents.
10. With the Parcel layer highlighted in the table of contents click on the Contents, Description and Previews tab as illustrated in the figure on the next page.



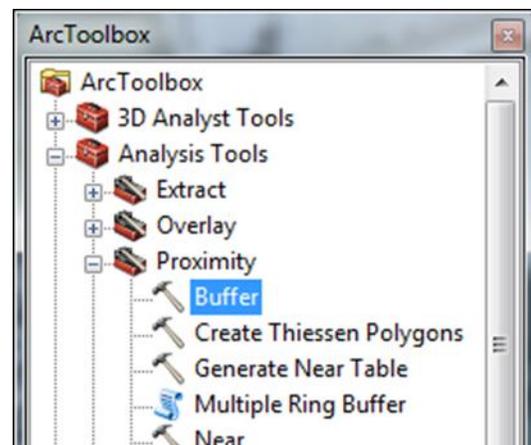
11. Look at the Contents, Description and Preview tab for the Roads layer and the Boise Imagery.

### Exercise 3: Exploring ArcToolbox

1. Open ArcMap and Click Downtown\_Boise under “Recent”.
2. Click on the ArcToolbox Window button as shown below.

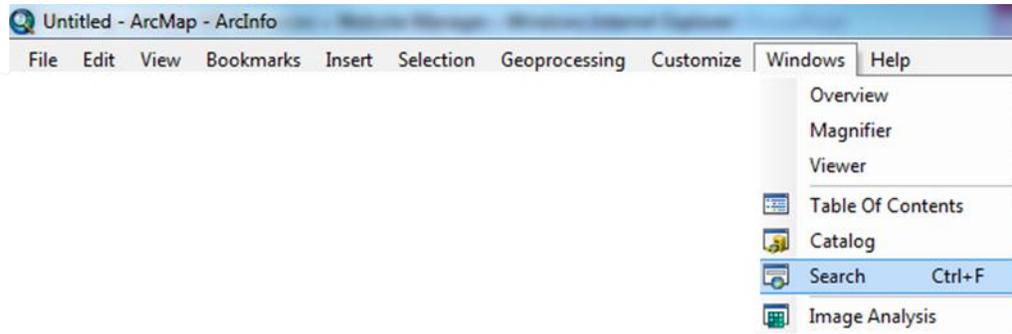


3. ArcToolbox opens up and you will see many tools for geoprocessing and geospatial analyses frequently performed in ArcGIS. Some of the tools you see, for example the 3D Analyst Tools near the top of the toolbox, requires an **extension**, which is an addition to your software that you can purchase from ESRI. Click the + in front of “Analysis Tools” and then also the + in front of “Proximity”. Double click on “Buffer” to start the Buffer Tool.
4. Since the purpose of this chapter is to give you an

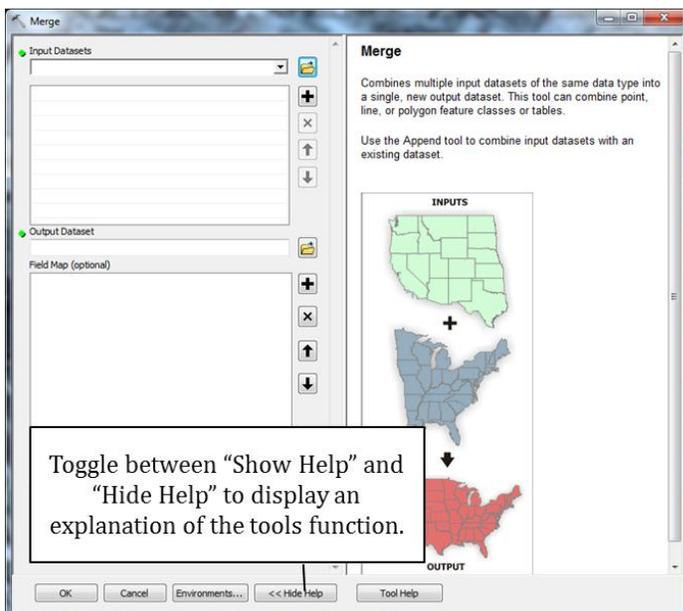
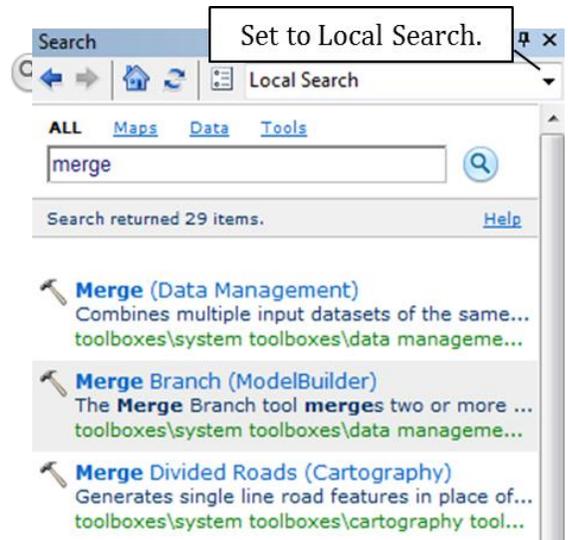


overview of different ArcGIS components we will not actually run any tools at this time. Click cancel to exit the buffer tool. Also click the little “x” in the top-right corner of ArcToolbox to close the toolbox.

5. A different way to find tools is by using the Search tab in ArcMap. Click on Windows near the top of your screen and select “Search” as shown below. Note that you can also open the Catalog window and table of contents from this “Windows” menu. A search tab opens up on the right hand side of your screen.



6. Assume you are interested in merging two layers together and you are not sure which tool would be the most appropriate. Type “merge” in the textbox on the search tab as shown on the right. Make sure that your search is set to “Local Search”. You can choose to click on the  button to look for maps, data *and* tools or click on “Tools” to only display tools. Click on “Tools”
7. Click on “Merge (Data Management)” to open the tool. Toggle between “Show Help” and “Hide Help” as shown below. Click “Cancel” to close the tool.



## 2. Different levels of functionality in ArcGIS Desktop

When purchasing ArcGIS Desktop software you have a choice of three different levels of functionality: **ArcGIS Basic** (formerly known as ArcView), **ArcGIS Standard** (Formerly known as ArcEditor) and **ArcGIS Advanced** (formerly known as ArcInfo). Prices vary based on the level of functionality, for example – at the time of writing – an ArcGIS Basic single-use license costs about \$1,500 while the ArcGIS standard single-use license is around \$7,000 US. However, the more advanced levels do give you more functionality for your money.

**ArcGIS Basic** allows users to view, symbolize and query data as well as perform many geographic analyses. The main drawback of ArcGIS Basic is that you can only edit shapefiles, and not any other types of geographic data such as personal and file geodatabase. Because of this you are unable to take advantage of many of the features and tools available to you that only work with those geodatabases. Some counties that have a need for more than one ArcGIS license will typically purchase an ArcGIS Standard license to edit geodatabases in combination with a cheaper ArcGIS Basic license for map production, some shapefile editing and other basic map functions. While ArcGIS Basic cannot edit geodatabases, it will allow users to view them.

**ArcGIS Standard** includes all the tools and functions found in ArcGIS Basic. Additionally, you can edit geodatabases which will provide you with more tools to create, edit and ensure the quality of your data. For example, ArcGIS Standards has the “Traverse Tool” that you can use to enter bearing and distance descriptions to generate lines and polygons. For some counties this may be a time saver if legal descriptions can be entered directly into GIS instead of using a separate program.

**ArcGIS Advanced** includes all functionality of ArcGIS standard plus advanced spatial analyses, tools for manipulating data and high-end cartographic tools.

For each of those three GIS software packages you can buy either a **single-use license** which allows you to install ArcGIS on one computer or a more expensive **concurrent-use license** that allows you to install ArcGIS on multiple computers and share the license. This means that at any given time one person can use ArcGIS, but this person can change depending on who has the greatest need to use it at any given time.

### Exercise 4: Determining your ArcGIS Desktop version

1. Start ArcMap and open the Downtown\_Boise.mxd map document. Click “Help” along the top of your screen and select “About ArcMap”.
2. The “About ArcMap” dialog box, as shown on the right, will give you information about your version of ArcMap including the License type and the service packs that have been installed.

